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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/941,546	08/30/2001	Howard E. Rhodes	M4065.0422/P422	6096

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EXAMINER

KANG, DONGHEE

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/941,546

Applicant(s)

RHODES, HOWARD E.

Examiner

Donghee Kang

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-79, 113-131 and 141-152 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-79, 113-123 and 141-150 is/are allowed.
- 6) ☒ Claim(s) 124-131 and 151-152 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) Z.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. Acknowledgment is made of receipt of applicant's Information Disclosure Statement (PTO-1449) filed 16 December 2002.

Election/Restrictions

2. Applicant's election without traverse of Group II (Claims 1-79 & 113-131) in Paper No. 8 is acknowledged.

Acknowledgment

3. Applicant cancelled claims 80-112 & 132-140 and added new claims 141-152. Thus, claims 1-79, 113-131 & 141-152 are pending in this application.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the phrase "*said first, second and third doped regions having a substantially different depth in said substrate*" must be shown in Fig.12 or the feature(s) canceled from the claim(s). No new matter should be entered.
5. The drawing 14 is objected to because the numeral "**131b**" for reset gate electrode should be "**132b**". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities: The numeral "p-well **60**" should be "p-well **160**" line 8 on page 18.

Appropriate correction is required.

Claim Objections

7. Claim **126** is objected to because of the following informalities: the phrase "said first, second and third color wavelength components are red, green and blue, respectively" is misdescriptive because the second and third color wavelength components are blue and green, respectively. Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims **124-125 & 127-131** are rejected under 35 U.S.C. 102(b) as being anticipated by Kubo et al. (US 3,860,956).

Regarding claim **124**, Kubo et al. teach a color imaging sensor comprising (Fig.4g):

a substrate (20) having a first defined region (25) for sensing a first color wavelength component; a second defined region (27) for sensing a second color wavelength component; and a third defined region (26) for sensing a third color wavelength component, wherein the lower boundaries of each of said first, second and third defined regions are located at respective different depths from a surface of said

substrate and are displaced laterally such that said defined regions do not overlap (See also Col.4, lines 61-62).

Regarding claim **125**, Kubo et al. teach the lower boundary of each of said first, second and third defined regions corresponds to the depth of penetration of a respective color wavelength component into said substrate (Col.4, lines 27-30).

Regarding claim **127**, Kubo et al. teach at least two of said first, second and third defined regions having a substantially different depth from each other.

Regarding claim **128**, Kubo et al. teach all three of said first, second and third defined regions have a substantially different depth from each other.

Regarding claim **129**, Kubo et al. teach said first depth (25) is substantially greater than said second depth (27).

Regarding claim **130**, Kubo et al. teach said first depth (25) is substantially greater than said third depth (26).

Regarding claim **131**, Kubo et al. teach said third depth (26) is substantially greater than said second depth (27).

10. Claims **124-126** are rejected under 35 U.S.C. 102(b) as being anticipated by Kubo et al. (US 3,860,956).

Regarding claim **124**, Kubo et al. teach a color imaging sensor comprising (Fig.6h):

a substrate (20) having a first defined region (R) for sensing a first color wavelength component; a second defined region (G) for sensing a second color

wavelength component; and a third defined region (B) for sensing a third color wavelength component, wherein the lower boundaries of each of said first, second and third defined regions are located at respective different depths from a surface of said substrate and are displaced laterally such that said defined regions do not overlap (Col.5, lines 3-36).

Regarding claim **125**, Kubo et al. teach the lower boundary of each of said first, second and third defined regions corresponds to the depth of penetration of a respective color wavelength component into said substrate.

Regarding claim **126**, Kubo et al. teach that said first (R), second (G) and third (B) color wavelength components are red, green and blue, respectively.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims **151-152** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubo et al. (US 3,860,956) in view of Tsuei et al. (US 5,945,722).

Kubo et al., teach substantially the entire claimed invention, as applied to claim 124 explained above, except that said first, second, and third defined regions are each separated by an isolation region.

However, Tsuei et al. in Fig.3 teach that first (110), second (114), and third (112) defined regions are each separated by an isolation region (FOX). Therefore, it would

have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the isolation region as taught by Tsuei into the Kubo's device in order to provide an isolation region that would prevent an interference between said first, second, and third defined regions in the color imaging sensor.

Allowable Subject Matter

13. Claims **1-79, 113-123, & 141-150** are allowed.

The following is an examiner's statement of reasons for allowance:

Prior art reference, taken along or in combination, do not teach or render obvious that a color pixel cell for imaging device, said color pixel cell comprising:

at least two doped regions of a first conductivity type formed in a substrate, said at least two doped regions having a substantially different depth in said substrate and being displaced laterally such that said doped regions does not overlap; at least two photosensitive regions respectively formed in said at least two doped regions for respectively receiving photocharges corresponding to a particular color wavelength; and at least two floating diffusion regions of a second conductivity type formed in said respective at least two doped regions for receiving said respective photocharges transferred from said respective at least photosensitive regions. In the present claimed invention, a deep doped region is formed under a red or green pixel cell of a semiconductor substrate to increase the red response and a shallow doped region is formed under blue pixel cell to decrease the red or green response.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Donghee Kang
Examiner

dhk
February 23, 2003